Administration of Preoperative Oral Antibiotics is a Risk Factor for Postoperative MRSA Enterocolitis

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During in the 1980—90's, an outbreak of postoperative MRSA enterocoitis occured in Japan, and staphylococcal enterotoxin may be involved in the septic shock and MRSA enterocolitis. It has been suggested that various factors, such as the administration of preoperative oral antibiotics, administration of third generation cepharosporin group of antibiotics, and gastric acid inhibition due to the administration of histaminergic H2 receptor antagonists (H2RA), may be involved in the development of MRSA enterocolitis. When male Wistar rats were bred by total parenteral nutrition (TPN), and were continuously administered famotidine 4 mg/kg/day, the gastric acidity was observed to decrease to pH 6.4 ± 0.1. MRSA was able to cross over to the small intestine only during the famotidine medication. If rats were intravenously administered moxalactam (MOX) after an oral inoculation of MRSA, then the viable MRSA counts in the intestine decreased on day 4. In contrast, if the gastric acidity decreased and the rats were treated by an oral administration of kanamycin and metronidazole before an oral inoculation of MRSA and thereafter were administered LMOX, then the MRSA count significantly increased. It is thus concluded that a suppression of gastric acid and a great disorder of the intestinal flora is indispensable for the colonization of MRSA into small intestine, while in vitro the propagation of MRSA requires a continuity of suppression omit in the bacterial flora.

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Nosocomial Bacterial Infections and Their Antimicrobial Resistance Patterns in University Hospitals of Hamadan, Iran

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Background: Nosocomial infections constitute a global health problem, particularly by multi-drug resistant bacteria, leading to long-term hospital residences, increased economic burden, and a high rate of morbidity and mortality. The distribution of pathogens and antimicrobial residence patterns vary among countries and different hospitals within a country. The aim of this study was to determine the frequency and antimicrobial resistance patterns of nosocomial infections in university hospitals of Hamedan, Iran.

Methods: During a 1-year period from April 2006 to March 2007, all patients with culture-proven nosocomial infection were included. Diagnosis was made according to the Centers for Disease Control and Prevention criteria. Antimicrobial

Results: A total of 197 cases of nosocomial infection were diagnosed, out of which 170 patients had positive bacterial cultures, 12 had more than one infected area and 41 had polymicrobial cultures. Most cases were in intensive care units (57.4%). The common sites of infection were lower respiratory tract (51.8%), urinary tract (31.9%), and surgical wounds (11.9%). Klebsiella pneumoniae, Pseudomonas aeruginosa, Escherichia coli, and Staphylococcus areus were the most prevalent pathogens (32.7%, 22.9%, 14.8%, and 11.2% respectively). Most enterobacteriacea isolates were resistant to third generation cephalosporins. The resistant rates were 75.5% for K. pneumoniae, 76% for E. coli, and 85.7% for Seratia and Proteus. Among P. aeruginosa isolates, 26.5% were resistant to ceftazidim, and 36% to ciprofloxacin. Among S.aureus isolates, 80% were methicillin-resistant and 16.6% vancomycin-resistant.

Conclusion: The patients in the ICU are at a higher risk of nosocomial infection. The high prevalence of antimicrobial resistance in our hospitals, highlights the need of further infection control activities and serveilance programs that may leed to proper selection of antibiotic therapy for nosocomial infections.

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Effective Intervention and Vaccination Strategies Against Nosocomial Infection Based on Network Analysis

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Background: Nosocomial infection raises a serious public health problem, as indicated by large mortality rates of representative nosocomial pathogens such as methicilin-resistant *Staphylococcus aureus* (MRSA) and recent community and world-wide outbreaks of influenza and severe acute respiratory syndrome involving community hospitals. Epidemic modeling for general communities based on contact networks of individuals is a powerful tool for understanding those large-scale epidemic outbreaks. However, disease propagation may occur in health care facilities in a manner different from in a community because of different contact patterns in the two situations. We explore effective containment strategies against nosocomial infection by numerical simulations of epidemic dynamics on contact networks of a real hospital.

Methods: We construct contact networks of patients, nurses and doctors in a community hospital in Tokyo, Japan. We simulate the stochastic susceptible-infected-recovered model to investigate epidemic spreads in the hospital. We also simulate the effect of network-based intervention and vaccination protocols.

Results: Intervention methods that restrict communication between doctors and visits of doctors to different wards shrink final epidemic size more than the intervention method that directly protects patients. Vaccinating doctors with priority rather than patients or nurses is also effective.